

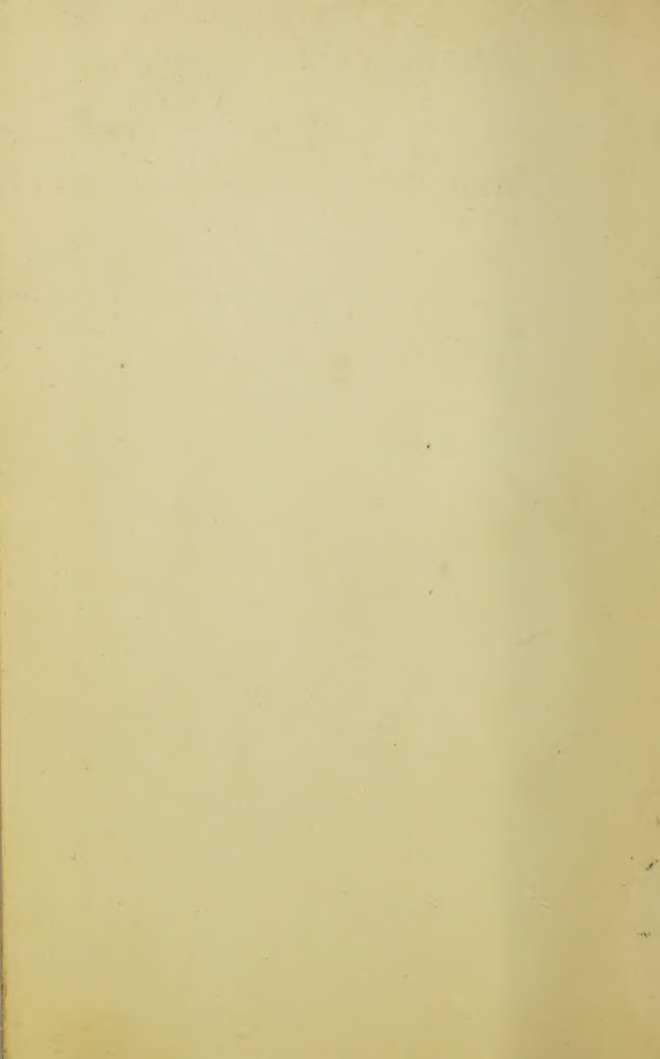
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Making Floors

By

ABBOT McCLURE

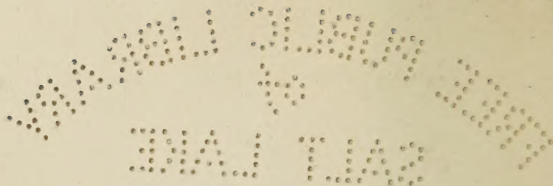
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CONTENTS

CHAPTER	PAGE
I INTRODUCTORY	5
II CONCRETE, TILE, MOSAIC, STONE AND BRICK FLOORS	8
III WOODEN FLOORS, NEW AND RE- MADE	25
IV PATENT, COMPOSITION AND MIS- CELLANEOUS FLOORS	47
V FLOOR FINISHES AND THE CARE OF FLOORS	54

THE ILLUSTRATIONS

HALL FLOOR OF HEXAGONAL RED-BROWN TILES	<i>Frontispiece</i>
	FACING PAGE
HALL FLOOR OF LARGE AND SMALL REC- TANGULAR TILES	8
HEARTH PAVED WITH NATIVE STONE .	14
ENCLOSED PORCH WITH BRICK FLOOR- ING	22
EXAMPLE OF MOSAIC FLOORING . . .	30
OLD WIDE BOARD FLOOR	40
HARDWOOD OVERFLOOR OF NARROW STOCK	44
HARDWOOD OVERFLOOR LAID HERRING- BONE-WISE	50

Making Floors

I

INTRODUCTORY

THIS book is intended both for the property owner and for the tenant, to meet whose wishes floors are built or relaid by the landlord. It is meant as a practical guidebook and reminder for all who have to make choice of floors, that they may know the qualities and characteristics of the several kinds of floors, judge which sorts are fittest for their respective purposes, make their choice intelligently and state clearly what they wish. It is also meant to give such information, relative to the peculiarities of construction in each case, that the reader may know how the different kinds of floors ought to be laid and may be in a position to see that his wishes are properly and

6 *Making Floors*

honestly carried out. It is not a specifically technical treatise for the carpenter or joiner, as it is not supposed that the reader will lay his own floors, but it contains what he needs to know for purposes of superintendence and safeguarding his interests.

* The function of a floor, apart from its physical office of supporting the furnishings of a room and affording a stable and level footing for the occupants, is to supply a suitable foundation for the rest of the permanent equipment of decoration, that is to say, the finish of the walls and ceiling, with which it will supposedly be in harmony. If the foundation made by the floor is not good, the effectiveness of all the rest of the room is necessarily impaired and sometimes wholly jeopardized. In this respect, the relation of the floor to the rest of the room is comparable to the relation between shoes and the rest of personal apparel. If a person is ill shod and careless about the appearance of his feet, he will inevitably look shabby and slovenly, no matter how much punctilious solicitude he bestows on the other parts of his attire. In the same way, a poor floor will spoil

an otherwise good room, while a good floor always makes it easier to decorate and furnish to good effect.

The applicability of the several kinds of floors to special uses, as well as the proper employment of composition flooring, will be dwelt upon. So far as it is possible to do so, the figures of approximate cost will be given as a guide but it must be borne in mind that charges for labor and the prices of materials are subject to variation according to locality and that it will be best, therefore, to regard such quotations as relative rather than as absolutely exact.

II

CONCRETE, TILE, MOSAIC, STONE AND BRICK FLOORS

THE objection is often made that floors constructed of any of these materials are cold to the feet and are, therefore, undesirable. To this it may be answered that in rooms where people sit, and necessarily have their feet in contact with the floor for any length of time, these materials would, under most circumstances, be thoroughly undesirable, but there are many places in every house where people do not sit and where these materials may be used for floors with perfect propriety and comfort and oftentimes they suit the purpose better than wood.

As an apposite instance of this may be mentioned the hat and coat room of a recently built country house, known to the writer, in New England. A door from the side of the vestibule opens directly into it

While another door opens from the coat room into the hall. Around the sides of the room are lockers for the stowage of overshoes, rubber boots, leggins, skates, snowshoes and all the other similar outdoor paraphernalia belonging both to the grown-ups and the children of the household. Above the lockers are rows of hooks for coats, hats and caps. There is likewise a place for umbrellas. Into this room, also, are brought sleds, perambulators and hockey sticks. The floor is tiled over its whole surface. Unavoidably much mud, snow and wet are tracked in from out of doors, but as the floor is tiled it is readily washed up, dries quickly, is clean and perfectly sanitary.

Halls or long galleries that are not intended as places to sit in, but are meant merely as passage ways and connecting links between rooms, may very well be floored, too, with any of the previously mentioned materials, and even a "den," where the master of the house may have his guns and various kinds of paraphernalia for outdoors and where there is likely to be a deal of smoking and ashes dropped on the floor, may be appropriately

paved with brick. Enough has been said however, without adducing further examples, to show the importance of materials other than wood as flooring resources.

CONCRETE

Concrete flooring is suitable for porches either open or enclosed, for coat rooms laundries and, if it is suitably embellished with inset tiles or some other appropriate decoration, for conservatories, bathrooms vestibules, halls, galleries, music rooms and even dining-rooms.

One of the chief objections to the use of concrete or cement flooring is its dull, uninteresting, unsympathetic color, which can never be much improved by mixing pigment in the cement. This objection can be overcome in either of two ways. Tiles of agreeable shape, color and pattern may be set in the concrete as a border or disposed at intervals over the surface of the floor. This treatment will give the requisite note of color and interest. The other way of removing the objection requires that the surface when the flooring is laid be not "floated" too smooth. Bur-

lap is sometimes wrapped about the

floats" to prevent the surface of the cement from becoming too smooth, or the surface may be floated with a piece of rough board. This slightly rough surface is then given a coat of cement filler and next a coat of varnish or shellac or, easier still, an oiling. As to the varnish, shellac and oil, more specific directions will be found in the final chapter on the care of floors. The second method of enlivening a concrete floor may be employed in conjunction with the first. If desired, a cement floor may be painted and then given a coat of shellac or else waxed.

It may seem astounding to some readers to find concrete flooring suggested as a possibility for a dining-room or hall but the writer has known it to be employed most satisfactorily in both capacities. The dining-room floor alluded to is in the suburban home of a well known American artist who, though extremely original, can scarcely be accused of impractical eccentricity. This dining-room is on the ground floor and has no cellar underneath — having a cellar under the whole house is a general American obsession by which our British kinsmen are not affected. They

find it practicable and convenient to have a cellar under only a part of the house with merely an air space beneath the rest and sometimes not that. In not a few instances recently, American architects have adopted the same arrangement with satisfactory results. The floor or paving, if one prefers so to call it, of this artist's dining-room is laid on the usual cinder foundation and the steam pipes for the radiators are carried underneath, sufficiently below the surface not to impair its solidity. Though built thus directly upon the ground, the concrete floor has proved neither damp nor cold. A large rug covers the centre of the floor and around the sides the repulsive concrete surface has been judiciously relieved by inset tile embellishments. The result is satisfactory from the points of view of both physical comfort and interior decoration.

Of course, if concrete floors are to be used anywhere else than on the ground floor, where they may be laid as just stated, there should be steel floor joists to afford proper support and stiffness for the weight and, if they are used on the ground floor, when there is a cellar underneath,

steel or iron joists are also necessary. In laying a concrete floor for a porch or for a room without a cellar underneath it, a carefully prepared, deep cinder bed should be laid and solidly tamped after sufficient moistening just the same as for a concrete sidewalk. The cinder bed should be at least six inches thick. In mixing the rough concrete for the body of the floor, broken or crushed stone or screened gravel should be used, coarse sand and Portland cement in the following proportions: — two parts of clean, coarse sand, four to five parts of stone and one part of Portland cement. These should be thoroughly mixed together before water is added. This grouting should be spread on the cinder bed to the thickness of three or four inches and thoroughly leveled and solidly tamped until water begins to show on the surface. The surface or finishing coat should consist of one part of Portland cement and one and a half parts of clean, sharp sand or crushed stone screenings. It should be evenly applied one inch thick and “floated” quite level. If preferred, the surface may be finished perfectly smooth by trowelling moderately or may be left a little rough by

using a rough float, as mentioned previously, by "skinning" while the cement is green or, if the cement has set firmly, by using a bush hammer slightly. It will not do to have the floor too rough and refraining from over-care in trowelling will usually give a good result.

It will ordinarily be better to divide the surface into sections by grooves or indented V lines so that in case any portion has to be taken up it may be put down again without marring the appearance of the whole floor by an irregular, jagged edged patch.

Any tile embellishment used must be laid in place before the surface coat is applied so that the tiles will be firmly embedded in the cement. If the tiles bear any decorative design in relief, their surface should be slightly depressed below the level of the concrete surface to avoid awkward projections. Bricks as well as tiles may be used for border or recurrent figure ornamentation with a concrete floor.

Specific directions for the finish and care of concrete floors are given in the last chapter.

The cost of laying a concrete floor, when

There is no cellar beneath, irrespective of any tile ornaments, will be the same as for laying an equal extent of cement sidewalk at about 17-20 cents per square foot. To lay a concrete floor on steel or iron girders, the spaces between the girders should be arched in with hollow building tile or firebrick. The concrete grout will be laid directly upon the upper surface of the tile or firebrick without using a bed of cinders as a preparation.

TILES

Tile floors are suitable for all the places mentioned at the beginning of the section on concrete floors. Tile flooring has the advantage over concrete or cement in the infinitely greater variety readily obtainable in color, texture and design. Having decided upon a tile floor, the chief thing next to be determined is the choice of pattern and color. In general, so far as the design is concerned, it will be safest to aim at the utmost simplicity and avoid busy patterns or conspicuous contrasts, except in cases where a distinctly decorative effect is desired.

A floor of a single, unbroken color is

always dignified and satisfying, or two harmonious colors may be blended throughout the whole surface in about equal proportions, the tiles of alternate colors being evenly intermixed. The manner of distributing two colors is susceptible of almost endless variety, according to the

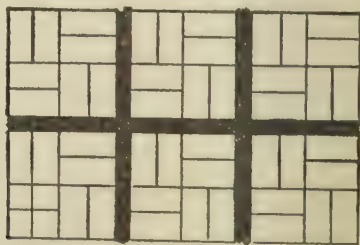


Fig. 1. One method of getting variety in a tile floor by reversing direction of tiles of uniform color and shape and by introducing extra wide mastic joints at regular intervals

shape and size of the tile units which may be square, oblong, round, triangular, hexagonal or octagonal and either large or small. A great deal of variety in pattern may also be attained by the simple expedient of varying the width of the cement or mastic joints (see Figures 1, 2, 3 and 4). By coloring the cement or mastic, the

ve an agreeable contrast with the color monotone tiles, much variety and interest may likewise be gained. For an example of this method, see Figure 1, where the mastic in which the tiles are set is black while the tiles themselves are light buff. Then, again, there is a great difference in the effects of floors laid with uniformly

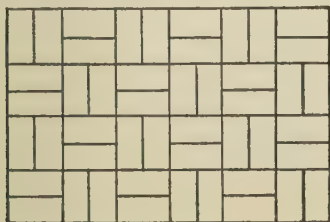


Fig. 2. Contrasting effect of tiles laid in precisely same way as those shown in Fig. 1, but without the wide mastic joints

wide joints between the tiles and floors made of the same tiles with uniformly narrow joints. For an example of this see Figures 1, 2, 3 and 4.

The choice of color must depend upon the needs of the individual case. As to the surface, whether it be absolutely smooth and level or somewhat irregular, that must

be decided by individual preference. Glazed tiles of irregular surface are exposed to constant wear, the glaze is apt to wear through in spots and expose the "body." On the other hand, smooth surfaced, unglazed tiles, if regularly gone over and cared for, often take on an agreeable

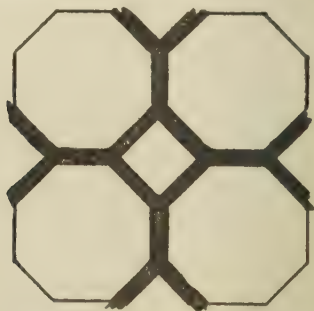


Fig. 3. Octagonal floor tiles with uniformly wide mastic joints. To be contrasted with Fig. 4.

patina, especially if they are hard burned.

Owing to the weight of tile flooring, it is always advisable to have the bed supported on steel or iron joists, the space between being filled with hollow arching tile. This will give firm support for the concrete or mastic bed in which the floor

les are to be laid. The concrete bed should be several inches thick. When it is not possible to use iron or steel joists and the tile floor is to be laid over old wooden joists, the tops of the joists must be cut down an inch or two and solid boarding must fill the spaces between. This will ne-

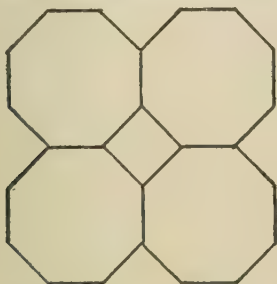


Fig. 4. Octagonal floor tiles with uniformly narrow joints. To be contrasted with Fig. 3

cessitate shortening the struts, used to stiffen the joists, and setting them at a more acute angle than they usually make when they rise to the top of the joists. The bed for the floor tiles will then be laid on the boarding. The joints between the tiles will be filled either with cement or with mastic, both of which may be colored as

desired. Exclusive of the joists, whether iron or wooden, and the filling between them, whether of hollow tile or of board, the cost for preparing the bed and laying tiles of average size ought to be about 5 cents per square foot if the joints are filled with cement and 55 cents per square foot if the tiles are set in mastic. A tile floor may be water-proofed by giving the bed a coat of bitumen before the tiles are laid in place. They may then be laid directly on the bitumen and the joints filled with mastic.

MOSAIC FLOORS

So far as the physical side is concerned mosaic floors are suitable in any of the places where the use of cement or tile floor was suggested. Owing, however, to the peculiar fitness as a medium for the expression of essentially decorative *motifs*, the use is especially to be recommended for bathrooms, conservatories, halls, vestibules or other places where attempts at decoration must be chiefly confined to the physical features and movable decoration would not be desirable.

In the choice of colors and pattern for

se in mosaic floors we find considerably more latitude in some ways than with tiles. The very nature of the medium gives opportunity for a degree of lightness and playfulness that would be out of place in tile flooring. Mosaic flooring lends itself not only to the execution of geometrical patterns but particularly to the delicacy of arabesques and sundry Pompeian designs in which are apt to occur peacock greens, deep amber yellows and occasional notes of black. Now and again mythological or classic designs in roundels, quatrefoils or the like, may also be effectively set at intervals in a mosaic pavement. One thing, however, must be kept in mind. No matter where the mosaic flooring is to be used and no matter what variety or richness of coloring is permissible, let all designs be frankly decorative and not pictorial. The preparation for laying a mosaic floor will be the same as for tiles. —

STONE AND BRICK FLOORS

Proper places for the employment of stone and brick floors will readily suggest themselves in special and individual cases but they may be particularly recommended

for long galleries or halls, loggias and conservatories. Where there is no cellar beneath they should be laid in beds of concrete over cinders, sufficiently thick to prevent dampness from coming through. When there is a cellar beneath stone or brick flooring, the weight must be supported on iron or steel joists or else on masonry and there must be a proper bed of concrete provided, as for tiles.

→ Random shapes and sizes of local stones are often effectively employed both here and in England in some of the more recently built houses. The only essential requirements are that the stones present a reasonably smooth surface and be fitted closely together. How agreeably they may be made use of can be seen in the illustration opposite page 16. Cut stone, of course, and marble in large or small quantities or other shapes will be included in the category of stone flooring possibilities.

Large quarry bricks, as well as bricks of the ordinary shape and size, are to be recommended for flooring purposes. They will be found more convenient to manage than stone in most cases. A good deal of variety in pattern can be accomplished by

using ordinary bricks. They might be laid, as in Figure 2, or herring-bone wise, as in Figure 5, or in various other ways as ingenuity may suggest. It is well, however, to avoid setting some bricks on edge and others flat. Let all be set in one manner or the other. All joints, whether in stone or brick floors, should be carefully

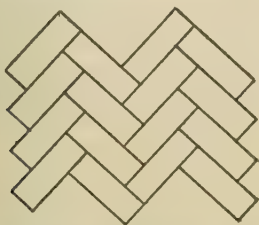


Fig. 5. Method of laying floor of bricks on edge, or tiles, in herring-bone pattern

filled with cement. Stone, marble or brick floors afford broad variety of color and texture. It is impossible to quote any figures of approximate cost where there is so much diversity in quality and supply in different localities.

From what has been said in the preceding paragraphs respecting stone, brick, tile and cement floors, the reflecting reader can

make his own deductions and applications to fit his individual needs, but he will do well to bear in mind that floors of this sort often have a rich decorative value, that their charm is permanent and that, merely out of deference to a conventional prejudice, it is foolish to insist upon having conditions made suitable for sitting in numerous places where people have no inclination to sit and will not sit and where general purposes of both economy and good taste would be served much better by having stone, brick, tile or cement floors.

III

WOODEN FLOORS, NEW AND RE-MADE

WOOD is so usual a material for floors that people ordinarily overlook the many possibilities of variety it affords and rest content with the assumption that a wooden floor is a wooden floor, that some are better than others, of course, and that a hardwood floor is generally preferable to a floor of soft wood.

First of all, it is important that we recognize the distinguishing qualities of the several kinds of wood flooring and the suitability of each to our particular purposes and then we must consider the choice of the varieties at our disposal.

The soft wood floor is relatively inexpensive and lends itself to staining and painting but its surface is readily dented and marked, it wears unevenly and, unless carefully laid with selected lumber, is apt

to splinter and split off in large pieces so that its chief recommendation is its comparatively low cost. The hardwood floor requires a much larger initial outlay but once put down, it is susceptible of far better results and has the advantage of unlimited durability.

Of the soft woods suitable for floors North Carolina yellow pine and Georgia yellow pine are those generally used. The most desirable is the rift Georgia yellow pine. Old wide white pine boards make an excellent floor but it is next to impossible to get them except when an old house is demolished. The new timber is narrow and has not the same charm.

Of the hardwoods particularly desirable for flooring purposes, those most frequently employed are oak, birch and teak. Nothing is quite so satisfactory as oak in point of price, appearance and wearing quality. Of course, a great many hardwoods can be used for flooring but most of them are expensive and rare and it would not be practicable to suggest their employment. The importance of having well seasoned timber cannot be too strongly emphasized.

The invisible part of floor construction is apt to be overlooked, as a rule, by all but architects, builders and carpenters, but there are times when it is well for the occupant of a house to know what is under his feet and how his floors ought to be laid. Especially is this so at times when repairs or relaying become necessary.

The ordinary flooring consists of a row of parallel wooden joists, usually set at a distance of about twelve inches apart in the clear, supported at each end by a wall. The floor boards are laid at right angles (occasionally diagonally) to the joists and directly upon them. The joists, under ordinary conditions, should be at least two inches thick, both for the sake of rendering the floor stiff and staunch and to prevent splitting when the floor nails or brads are driven in. Ten to twelve inches should be the depth of the joists. It is usual to stiffen the joists and prevent them from buckling by setting struts between them, as shown in Figure 6. The ceiling of the room below is attached to the under side of the joists.

In order to deaden sound, rough boarding may be placed between the joists about

half way their depth. This boarding rests on cleats or fillets nailed to the sides of the joists and on top of the boarding is placed a layer of mineral wool about an



Fig. 6. Method of placing struts between joists

inch or an inch and a half thick, as shown in Figure 7. The mineral wool costs about $1\frac{1}{2}$ cents per square foot an inch thick. This remedy for sound conduction



Fig. 7. Method of deadening sound by use of mineral wool. Dotted section indicates layer of mineral wool

can be readily applied to old floors if there is occasion to take up the boards at any time.

Floor boards of whatever width should be carefully matched and laid close to-

gether and it is important that the heart side of the board should be placed downwards so that in any further drying, after the floor is laid, the edges may press downwards instead of turning upwards. Floor boards should be at least $\frac{5}{8}$ of an inch thick and, if it is possible to make it so, an inch thickness is better. This will mean inch thick stock worked down to about $\frac{13}{16}$ of an inch.

In many old floors it will be found that matched boards with square joints (see Figure 8) were used and oftentimes a narrow, thin strip (as in Figure 8) was laid immediately under the joint. When timber was thoroughly well seasoned, so that it might be depended upon to keep its



Fig. 8. Square joint

shape, this method of floor laying was feasible, but where the boards are not thoroughly seasoned, as they are almost certain not to be in the present day, they are more apt than not to shrink, twist and become perceptibly crooked. Then the joints will open and leave awkward chinks.

For an inexpensive but acceptable and serviceable floor, well selected and matched barn boards are sometimes used. In one instance, known to the writer, where such flooring was to be laid in a new house, after the boards had been chosen at the lumber yard they were laid loosely upon the joists of the rooms where they were to go. Fires were built in the heaters and the boards were left thus to season for seven or eight weeks before being put in place and nailed to the joists. Although the boards were ungrooved and, therefore, laid with square joints, they have stood the test well for more than a year and very few chinks have opened. There is always a good deal of risk, however, in following such a course and it should never be attempted unless the lumber is most carefully picked to begin with.

Another method occasionally employed in old floors was to rebate the edges of the

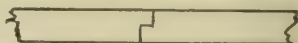


Fig. 9. Rebated and lapped joint

boards and lap them (as in Figure 9). It was more usual, however, to have double

groove boards with loose, separate tongues (as shown in Figure 10). The tongued

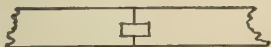


Fig. 10. Double grooved floor boards with loose or sliding tongue

and grooved board, as we now know it (see Figure 11), was of later contrivance.

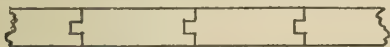


Fig. 11. Modern tongued and grooved floor boards, each board having a groove on one edge and a tongue on the other

The old floors, laid with wide boards, are so thoroughly seasoned that they may generally be depended upon to keep their shape and preserve even joints, unless subjected to an unwonted condition of overheating. The wide boards — sometimes they are eighteen inches and more wide — of the old floors have a most agreeable aspect and are satisfactory in their accustomed place, but for us it is not advisable, for two reasons, to attempt to use them in present day work. In the first place, it is now next to impossible to procure lumber of such width and, even could one do so,

the price would be prohibitive. In the second place, owing to the great difficulty of securing properly seasoned timber and the consequent tendency of the wood to shrink, warp and twist, the result would be disastrous for the floor boards would pull away from each other in a few months time. It is much better, therefore, to use narrow stock, although the wide boards always give a floor an air of distinction and interest. It is, furthermore, advisable to move lumber for floors only in dry weather and floors should be laid preferably in warm, dry weather as the lumber is then in the most favorable condition and most tractable.

The cost of floor boarding, tongued and grooved, $2\frac{1}{4}$ inches wide and $\frac{13}{16}$ inch in thickness is:—

	Per 1000 feet
North Carolina yellow pine	\$35.0
Rift North Carolina yellow pine . .	47.5
Georgia yellow pine	45.0
Rift Georgia yellow pine	65.0
Clear White Oak	70.0
Clear Quartered White Oak	100.0
Clear Red Oak	68.0

Per 1000 feet

Clear Maple	65.00
Clear Beech	80.00
Clear Birch	80.00

Barn boards of white pine, 12 inches wide, planed, cost \$45.00 per 1000 feet.

Again the reader must be cautioned that the prices just quoted cannot be regarded as at all fixed. They are the figures prevailing in the Eastern States at date of writing, April, 1915, are liable to change at any moment and are given merely for the purpose of indicating relative values. The prices quoted are not the lowest obtainable but are for the best selected stock which, in the end, it is most economical to buy.

The Georgia and North Carolina yellow pine will usually exceed $2\frac{1}{4}$ inches in width and is apt to be nearer 3 inches. With the hardwoods it will be necessary to allow for about $\frac{1}{3}$ waste in tonguing and grooving so that about $\frac{1}{3}$ additional should be added to the prices in the above table when estimating for the actual floor space to be covered.

In addition to the term "rift" pine, we

find also the terms "rift sawn," "edge grain," "vertical grain" and "com grain," all of which have the same significance and mean that the lumber is sawed on the quarter (see Figure 12) in precisely the same manner as "quartered oak." This manner of sawing produces boards whose surface will not sliver and shell off

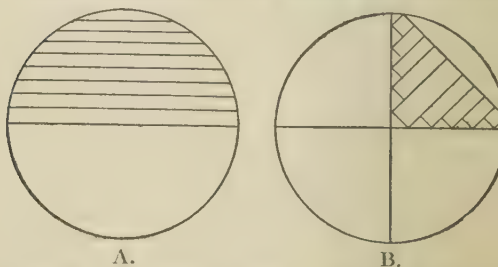


Fig. 12. A. Section showing method of "quartering" or sawing wood in the quarter. B. Section showing method of "flat sawing"

as they wear. Owing to changing atmospheric conditions, there is necessarily some degree of expansion and contraction in boards but the mischievous effects upon the floor, caused by such variations, are materially lessened by using lumber sawed in the manner just noted for the method of cutting or "quartering" makes the lin

of expansion and contraction act vertically, whereas in plain or flat-sawed lumber acts laterally or sidewise and hence a large part of the tendency to warp and crack. This consideration is exceedingly important in floor making and ought not to be neglected. There is a great opportunity for good joinery in floor laying but, unfortunately, it is an opportunity that is all too often ignored.

Teak may sometimes be obtained at a reasonable figure and in sufficient quantity for floors but, as the supply comes mainly from dismantled ships, particularly battle-ships, the price is subject to great variation.

Barn boards — these are not tongued and grooved — come planed as well as unplaned. They should be planed before being set aside to season.

Owing to its strong tendency to warp, twist and open joints, birch cannot be highly recommended for domestic flooring. It is also apt to lose its color and become dull in appearance.

All considerations being taken into account, quartered white oak is the best and most serviceable wood for new floorings.

It is very hard, resists wear and tear and as it is not subject to twisting and curling like some other floor woods, it retains its shape. It is also less liable than most other floor woods to be affected by changing weather conditions and variations of artificial heat and therefore the necessary expansion and contraction, to which all woods are subject, is not so marked in this case.

As the floor is obviously the groundwork for the furnishing of the room, it should, under usual conditions, have a neutral character and not force itself upon the notice by any peculiar method of construction or by any conspicuous or strongly colored pattern. The plainer it is the better and the more consonant with the principles of good taste. Nothing could be more beautiful than the perfectly plain oak floors in old English houses, mellowed from years of wear and waxing. It is not so many years since it was the prevalent fashion to lay hardwood floors in all sorts of uneasy and fantastic designs with crisp cross and zigzag borders and, occasionally, all-over patterns which distracted the eye and produced a disquieting, restless effect.

Thanks to a general change for the better popular taste, there now seems to be a preference for a single kind of wood and one color. Here good taste and economy, which is often the case, go hand in hand for

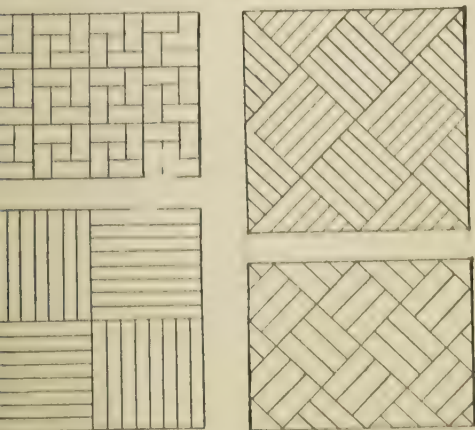


Fig. 13. A few possible patterns made by short lengths of hardwood

The plain flooring is not so troublesome or expensive to make as the more elaborate effects and likewise costs less to lay. If it is desired, in a hardwood floor of narrow boards, to create a degree of variety by

laying short lengths herring-bone wise in one of the patterns shown in Figure an underfloor for foundation is necessary. Hardwood floors of short lengths laid in form patterns may be put down over a cement underfloor. In such cases the underfloor is coated with a bitumen mastic or the pieces of wood have their under side dipped in the mastic and are then laid together in place.

RE-MAKING OLD FLOORS

Oftentimes an old floor, by a little care and well directed effort, may be brought back to a creditable and pleasing condition and the expense and bother of laying a new floor or an overfloor altogether obviated. It is always worth while, at any rate, to examine thoroughly and consider carefully just what can be done before embarking upon the making of a new floor for, after all, the old floor rejuvenated may turn out more desirable in the end than anything that could be made anew for a reasonable figure.

This is especially true in the case of old white pine or oak floors, laid at a time when builders had a choice of nearby virgi-

forests to draw from. Such timber could scarcely be had nowadays at any price within reason, if at all. If, for instance, an old floor of wide white pine boards can be tightened a little, it is well worth the small trouble and expense incurred to do it instead of laying a new floor or covering it with an overfloor. That it is worn a little uneven in places, and that the polished knots stand up slightly above the level of the worn surface, is no serious objection. Such a floor will well repay the trouble of working over it. When properly cleaned and finished it will have a mellowness and distinction that no new floor can possibly have. The same is true of old oak floors. If there is any way of saving them, they should be carefully cherished.

It is unwise to disturb an old floor further than one can avoid doing so but, if the stiffening and repairing of joists or the closing of cracks opened by shrinkage positively necessitate taking up the boards, scrupulous care should be taken to put each board back in the same place as before — this can readily be done by marking them before taking them up — and the

repairs should be made in warm, dry weather.

Furthermore, if it is essential to insert any patches, there should be as little sawing or cutting of the old stock as may be for even old and well seasoned lumber that has not for years given any appreciable evidence of warping or shrinking will often behave very peculiarly if its surface, to which time and wear have imparted a certain protecting patina, is seriously disturbed and fresh portions of surface are exposed to the atmosphere.

OVERFLOORS

When an old floor is quite past being made presentable or if, for some other reason, it is undesirable in appearance and would be better replaced, the most easy and practicable thing to do is to lay an overfloor upon it. If a hardwood floor is desired to take the place of an unprepossessing floor of some soft wood, it is much easier and less expensive to do this than to take up the previous floor and replace it by a wholly new piece of construction.

The most essential thing in preparing for an overfloor is to see that the old floor

carefully planed, patched if need be and made perfectly tight and level as a foundation. In an overfloor the boards should be laid at right angles to the boards of the sub-floor (as shown in Figure 14). If the boards of the overfloor are to be laid in herring-bone courses or diagonally, the direction of the sub-floor boards is of no special consequence. Straight laid floors,

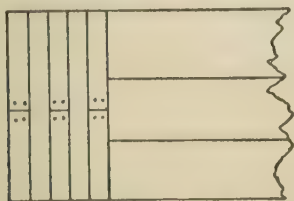


Fig. 14. Method of laying a thin overfloor of narrow boards over an old floor

however, are generally preferable, being simpler and less fussy. If a new sub-floor is laid, the boards are sometimes set diagonally to make a firmer job when the boards of the overfloor run at right angles to the joists. Sound deadening felt paper is often laid between the sub-floor and the overfloor.

It will be found advisable to have the

boards of the overfloor not more than 1 or 2 inches in width. Boards of this width may be had in thickness varying from $\frac{5}{16}$ or $\frac{3}{8}$ inch to $\frac{13}{16}$ or $\frac{7}{8}$ inch. The thicker boards, naturally, make more substantial floor than do the thinner and may be used without any sub-floor. The thin boards, $\frac{5}{16}$ or $\frac{3}{8}$ inch thick, however, are extensively used for overfloors with entirely satisfactory results.

The next step, after deciding upon the kind of wood of which the overfloor is to be made, is to prepare a frame for it (see Figure 15) so that it may be put down both firmly and straight and not leave any unsightly or inconvenient chinks around the base-board at the sides of the room. On all four sides, next the base-board, strips are laid being of the same width and thickness as the other floor boards. These strips are mitered at the corners and thus afford a staunch frame against which the other boards may abut, making a firm and even junction. One advantage in an overfloor of thin stock is that it does not seriously complicate the question of floor level. An overfloor of $\frac{3}{8}$ or $\frac{5}{16}$ stock will not be thicker than a rug or carpet.

and will not necessitate altering door sills or planing away the bottom rails of doors.

If it is decided to use the thicker boards for the overfloor, they may be tongued and grooved and put down in the usual manner but if thin boards are used, as is

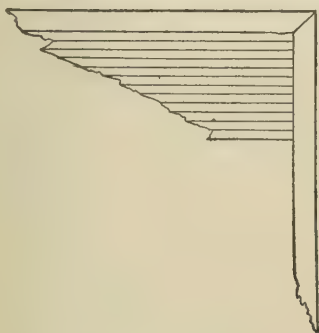


Fig. 15. This diagram shows how a frame with mitred corners is first laid next the base-board. Against this the other boards of the overfloor abut

generally the case, it is more advisable to put down stock with square edges which, of course, must be carefully matched. These thin boards should be fastened in place with $\frac{1}{4}$ inch nails, countersunk, and the nail holes should then be filled with

putty. If nails be driven into very thin tongued and grooved stock, there is always danger of the tongues splitting and then, when the boards are not securely held, the edges are likely to rise with an contraction.

The subsequent treatment of floors and overfloors, after they are laid or remade will be dealt with in the final chapter on finishes and the care of floors.

The cost of thin stock for overfloors given in the following table, the reader must again be cautioned, is by no means fixed and is quoted only to show comparative values. This stock has flat or square edges, that is to say, it is not tongued and grooved and must be laid with straight joints, as shown in Figure 8. It is $\frac{5}{8}$ or $\frac{3}{8}$ inch thick and $1\frac{1}{2}$ to 2 inches in width.

	Per 1000 feet
Clear White Oak	\$70.00
Clear Quartered White Oak	95.00
Clear Red Oak	68.00
Clear Maple	55.00
Clear Beech	55.00
Clear Birch	55.00

Georgia and North Carolina yellow pine do not ordinarily come in this thin narrow stock and would have to be specially ordered.

As to the total cost of hardwood overfloors, it is safe to say that the expense involved is appreciably less than it would be for covering the same area with good carpet. By a reasonable estimate, the area ordinarily covered by a yard of carpet — about $6\frac{3}{4}$ square feet — can be laid with clear quartered oak flooring in boards of $1\frac{1}{2}$ or 2 inch width, $\frac{5}{16}$ inch thick, for \$1.00 to \$1.50. Finishing is included in this figure. For the same area of carpet one would pay anywhere from \$2.50 to \$4.00 or more, so that it is plain to be seen that the cost of a hardwood overfloor is not only not prohibitive but less than the cost of carpeting.

It is furthermore to be borne in mind that it is also much more economical, for while carpets will wear out in time, a hardwood floor will last as long as the house, for the wood receives practically no direct wear if proper attention is given the finish and its maintenance.

The other woods suggested for use in

overflooring are proportionately less expensive to lay (see table on page 44) than clear quartered oak. The cost of laying a hardwood floor of thicker stock will be somewhat greater than it would be when $\frac{5}{16}$ inch boards are used but would still fall considerably below the figure it would be necessary to spend for a good carpet.

IV

PATENT, COMPOSITION AND MISCELLANEOUS FLOORS

THERE are often times and places when and where neither the ordinary wooden flooring nor any of the flooring materials previously mentioned seem quite to answer the requirements of the situation. For such cases some one of the many sorts of composition or patent floorings will almost invariably be found to fill the need satisfactorily.

There are as many ways of laying these floors and they present as many different aspects as there are distinct brands of patent or composition preparations. Some are laid in the manner of tiles, others are put down in sections and still others are fixed on the spot and laid in place like plaster or cement.

For obvious reasons it is impossible to mention any of these floor preparations

specifically or to comment upon the qualities or compare them one with another. Author and publisher alike would at once be charged, in the first place, with favoritism, subsidization and shameful commercialism of the press and, in the second place, it would be most invidious to draw distinctions between the merits and failings of this or that product. The only thing that can be done, therefore, is to note the several types of flooring, direct the reader's attention to the manifold possibilities open to him and leave him to make his own choice as he sees fit.

To begin with, there are the floors that are meant to be laid like tiles. In fact many of the preparations are called tiles. There are all sorts of rubber tiles, composition tiles and composition tiles, some of which are so shaped that their edges interlock while others have straight edges and are laid side by side in the usual manner of tiles or bricks. They also come in all sorts of colors to suit any taste and any occasion.

Cork tiles are particularly suitable for bathrooms, kitchens, butlers' pantries, laundries and passage-ways as they are

not injured by water, are not cold to the feet, are not fatiguing to walk or stand upon and deaden unnecessary sounds. Their color is not obtrusive and they are sanitary and easily kept clean. Furthermore, they possess flexibility and a certain amount of resilience and are not expensive. Good cork tiling may be laid for about 75 cents per square foot. It may be laid directly over a wooden floor but it is preferable to lay it on a thin coating of mastic about an eighth of an inch thick. This mastic gives an even bed and may either be spread over wood or over concrete, brick or asphalt. Besides the regular cork tiling, there are several excellent composition tiles made largely of ground cork. They have the usual good qualities of cork and, moreover, by means of the process of their preparation they are rendered almost indestructible and capable of withstanding unlimited wear without showing bad effects.

The suitable use of rubber tiles is exceedingly limited but they might be satisfactorily employed in butlers' pantries and bathrooms. Various composition tiles containing asbestos, magnesia or other

substances have each their several peculiar merits of which the prospective user will be fully informed immediately upon manifesting the least curiosity in that direction.

Of the floors, really overfloors, made in sections all ready to be put down, may be mentioned the strips of hardwood glued on a backing of heavy cotton cloth, which are virtually pieces of wood carpet as they are of about the same width as a strip of carpet. The individual strips of wood in the wooden carpeting are about $1\frac{1}{2}$ inches in width, so that when an old floor has been covered with these breadths the result is to all intents, that of an overfloor in which the boards are nailed in place, except that the joints between the breadths are stopped by narrow strips running at right angles to the short strips glued on the cotton backing. A floor covering of this kind, while not quite as pleasing as one that is more substantially and permanently fitted and nailed, at least minimizes trouble and expense in laying and possesses the advantage of being portable in case it may be convenient to remove it for use in another place. There are also

various other sorts of flooring to be had in sections all ready for laying.

The flooring that is laid like plaster or cement is particularly appropriate in bathrooms, kitchens, pantries or other places where sanitary considerations are especially to be thought of and where frequent washings make it desirable to have as few joints and crevices as may be, where dirt or moisture may linger or collect. Such composition flooring is a boon where there is a substantial but rough and undesirable floor that needs to be permanently covered. The composition when mixed can be laid either over rough boards or over cement. The only requisite is that the foundation be firm and tolerably level.

For the benefit of those who may wish to apply such flooring themselves, the following advice will be found timely. In mixing, do not add too much water at one time and thus run the risk of making the mixture too thin. Add the water a little at a time, mixing it in thoroughly the while, until the mixture has a good body, is of the consistency of thick plaster and works well under the trowel. While the composition may be trowelled directly upon

old floor boards, it is highly advisable to nail down first a covering of thin expanded metal mesh upon which to apply the plaster. This gives the layer of composition a much firmer hold and prevents the coating when dry, from rising and buckling in places, as it sometimes will do if the metal mesh is not used. The layer of composition should be $\frac{3}{8}$ to $\frac{5}{8}$ of an inch thick and should be very firmly pressed down evenly spread and trowelled smooth, exerting considerable downward pressure with the trowel all the while.

If the surface and color are not deemed pleasant, after the composition has dried it is a simple matter to paint it with floor or deck paint any color desired. This composition flooring is not to be regarded merely as an easily applied remedy for bad wooden floors. It has recently been employed for bathrooms and pantries in several large and costly country houses being painted for the sake of agreeable finish afterward. Its special advantage consisted in the absence of joints and also in the possibility of making coved angles with the walls.

With any composition flooring, whether

it be of a simple character so that the amateur can apply it himself or whether it be one of the more expensive and elaborate sorts, to be properly laid only by an experienced artisan, it is almost always desirable to have the angles at the junction of floors and walls coved.

While some of the compositions for plastering floors are costly and suitable only for large buildings, there are several that are quite inexpensive — they cost about 35 cents per square foot for both expanded metal mesh and material — are easily laid by an amateur and are suitable for domestic use.

V

FLOOR FINISHES AND THE CARE OF FLOORS

THE finish of a floor, no matter of what material it may be made, is an exceedingly important consideration. Of equal importance — and this too many people are prone to forget — is the care given the floor to preserve the finish, keep it in presentable condition and avoid the inevitable deterioration of surface when care is withheld.

CEMENT FLOORS

Cement floors, whether “floated” absolutely smooth or left with a moderately rough surface, should be gone over with cement filler and then treated with oiled sawdust. The oiled sawdust is used after the cement filler has quite dried. A small quantity of boiled linseed oil — not too much to be readily taken up — is poured into several panfuls of ordinary sawdust.

The sawdust is then swept back and forth with a broom over the floor until the surface has taken all the oil it needs. Sawdust is an excellent medium as it absorbs and holds the surplus oil, which otherwise would remain on the floor and leave a greasy appearance. It is also easier to apply the oil in this way than it would be to apply it with a rag or a brush.

This sawdust and oil dressing should be used frequently. It will prevent the deposit of fine dust that so often collects on the surface of cement floors or paving and, better still, it takes away the hard, ugly, unsympathetic color of the cement and gives instead an agreeable, mellow surface. A painted cement floor may be either coated with shellac or waxed. Waxing is preferable.

TILE FLOORS

The finish and care of tile flooring will depend to some extent upon the kind of tile used but, in general, it may be said that washings with ordinary soap and water will in a short time leave the floor dead and dull looking.

One excellent method of caring for tile

flooring is to go over it frequently with soft cotton or woolen rag dipped in milk. With a moderate amount of rubbing, this will produce a mellow and slightly glossy surface and bring out all the richness of color in the tiles.

Then, again, tile floors are often rubbed and polished with floor polishing wax. While the waxing also brings out the richness of color, it gives a much higher polish than does rubbing with a rag moistened with milk and some of the mellowness of aspect is lost.

Tiled floors may also be brushed with oiled sawdust, in just the same way as cement floors, with good result. Sometimes, too, rags with a few drops of kerosene are used but this method of caring for tiles cannot be particularly recommended.

A good tile floor deserves proper care and this care will be rewarded by the appearance it presents. Whichever of the foregoing methods may be used for polishing will also serve, at the same time, for cleansing purposes as well and soap and water should be avoided. Soap and water alone will deaden and dull the tile surface.

and are superfluous when any of the methods of polishing just recommended are employed.

Mosaic flooring should be cared for in the same way as tiles.

STONE AND BRICK FLOORS

For a stone floor, whether marble or otherwise, sweeping and mopping with damp, not wet, cloths will give the only satisfactory results. Do not try any of the methods suggested for cement or tiles.

Brick floors may be cared for with nothing but soap and water if preferred or, if one wishes to bring out all the rich color of the brick, any of the methods suggested for the care of tiles will answer the purpose admirably. Soap and water care will be clean but any of the other dressings will bring out the life of the brick as well.

WOOD FLOORS

Attention has already been called to the great beauty of the plain oak floors of wide boards in old English houses. Not a few old houses in our own Atlantic States are fortunate in having floors of the same sort but, in many instances, no ad-

vantage has been taken of their presence. Old floors of oak or other hardwood and old floors of white pine are things to be carefully cherished and made objects of pride. The old English method of treating oak was to feed it with a little oil — poppy oil preferably or else boiled linseed — and polish it with wax. Fillers were unused. We can get the same results with our floors if we will. Not a great deal of oil is used and not often, but a moderate application of wax and polishing is frequent. This treatment is recommended for old floors that are in good condition. If you are fortunate enough to possess an old floor that has never had any kind of attention except periodical visitations of soap and water, refrain from any preliminary treatment. Do not plane or sandpaper the surface and remove in a few hours what it has taken years of time to produce in softness of color. The floor being brushed clean and perfectly dry, apply the oil evenly and thinly with a brush. The oil will bring out all the beauty and rich tones of the wood. It will be well to leave the floor untouched for twenty-four hours. If, at the end of that

time, all the oil is absorbed, a second application might be made and allowed to stand the same length of time. Then with cotton waste or a soft cotton cloth wipe off any sweat of minute oil drops. After allowing to stand for a few hours and wiping off any dust that may have collected on the surface in the meanwhile, apply floor polishing wax (or melted beeswax mixed with a little turpentine), rubbing it on thoroughly with a piece of cheesecloth. After allowing the wax to get set for twenty minutes or half an hour, the floor should be polished with a weighted brush, using it first with the grain and then across the grain. For a final finish, a piece of Brussels carpet may be fastened about the weighted brush and the floor rubbed briskly. The weighted brush ought to weigh at least twenty-five pounds. It is not hard to operate, as weighted floor brushes are made with long handles set at such an angle that the brush is easily pushed back and forth over the surface to be polished. The treatment just recommended for old floors may equally well be applied to new. In any event, a coat of wax (a light application) should be ap-

plied and a polishing given once or twice a month to keep the floor in good condition, unless it is subjected to exceptional hard wear, in which case it might be waxed once a week. A waxed floor should not be touched with water but wiped clean with soft rag or mop.

Old floors whose physical condition is good but whose surface is not prepossessing enough to warrant waxing may very advantageously be stained or painted with floor or deck paint. If the cracks between the boards are very wide they may have to be stopped with putty or filler; if they are not too wide they may be stopped with the ordinary paste filler applied to the whole surface. One method of treatment for such a floor consists in staining it the desired color. Then put on a thin coat of white shellac. When thoroughly dry, rub down with fine sandpaper (No. 1 is good). Then apply paste filler, thinned to proper consistency, colored to match stain. The filler may be used either at this point as suggested or may be put on before staining. In many cases the filler is omitted altogether. Whenever it is applied, it should be well rubbed into the pores of the

wood with a piece of burlap. After the filler has dried, two or three coats of white shellac are applied, each coat being allowed to dry for twenty-four hours and then being rubbed down with either No. 0 sandpaper or else with powdered pumice or steel wool. The floor is then carefully swept with a covered broom and waxed.

Another method of treatment for an old floor is to give it several coats of floor or deck paint of the desired color. Sufficient drier should be put in the paint and each coat allowed to dry thoroughly before the application of the next. It is most essential that all paint, all shellac, all varnish, in fact whatever is put on with a brush, should be applied evenly, not too thick and worked in one direction so that brush marks will not show afterwards. When the last coat is dry, a good floor varnish may be evenly applied. Do not attempt to put a coat of paint on a floor that has already been painted and varnished or given some kind of glossy coat at a previous time. First remove the surface of the old coat with paint remover or sandpaper, otherwise the new paint will not stick but will flake off in patches.

A method of treatment that may be highly recommended for a North Carolina or Georgia yellow pine floor, is to stain in the desired shade with a stain of burnt Sienna or umber. Then apply a paste filler and afterwards wax the floor with polishing wax. The degree of polish in any case, of course, depends upon the amount of polishing done and it is perfectly possible to have a well waxed floor with an almost dull finish. Indeed the dull wax finish is often preferable for it is less slippery and certainly more mellow in appearance.

The use of both shellac and varnish on floors is more or less of a concession to laziness or, at least, a desire to keep a floor looking fairly well with a minimum of care bestowed upon it. Wax is unquestionably the most desirable finish to use. If shellac is used beneath the wax, or as a final finish, it must occasionally be patched and patches are very apt to show. Its surface is never so beautiful as wax and it is worth remembering that the most beautiful floors in the world, a great number of which are to be found in France and

England, are waxed and shellac has not been used at all in their finish.

In cases where an exceptionally durable varnish is desired for a painted floor or in some similar place, a fine quality of varnish is applied after the floor has been stained or painted. After drying for forty-eight hours it is well rubbed down with fine sandpaper or with pumice stone and oil. A second coat of varnish is then applied, allowed to dry for the same length of time and rubbed down with pumice stone and oil.

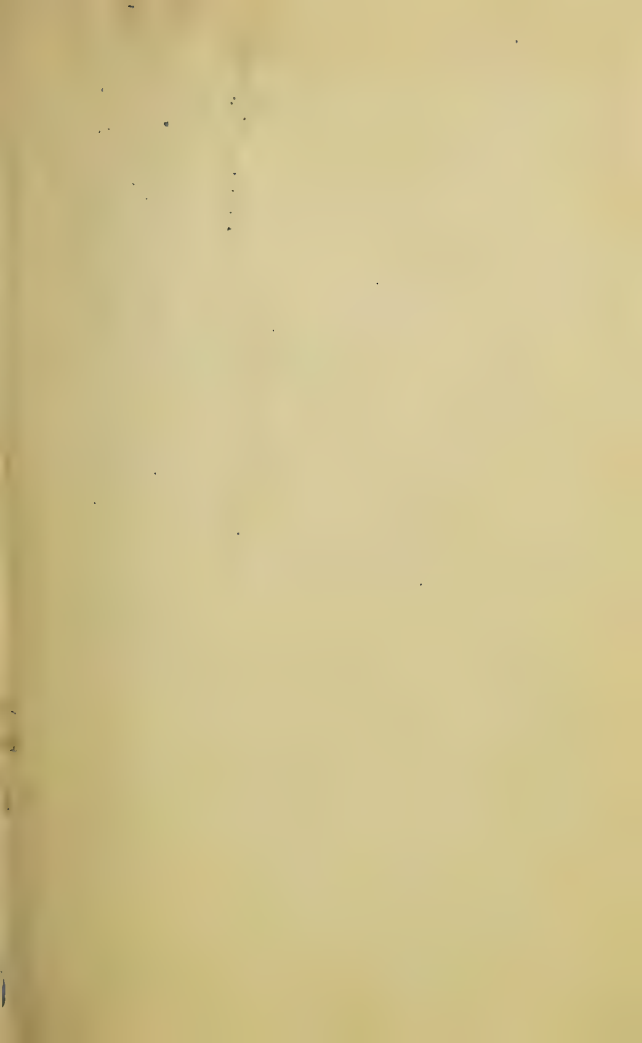
Hardwood floors that have been neglected and abused may be brought back to good condition by scouring them thoroughly with steel wool and using a little wood alcohol at the same time. After all the scarred and objectionable surface coat has been removed and the floor scraped, if it be necessary, the process of finishing will be the same as previously indicated. Scouring with steel wool may also be resorted to to remove an offensive excess of finish. In restoring an old floor to condition, deep stains may be bleached by using oxalic acid.

Above all things let it be remembered not to use water in cleansing floors that have been treated with any of the foregoing methods of finish. Remove all dust with soft, dry cloths and use wax and rubbing but do not use water..

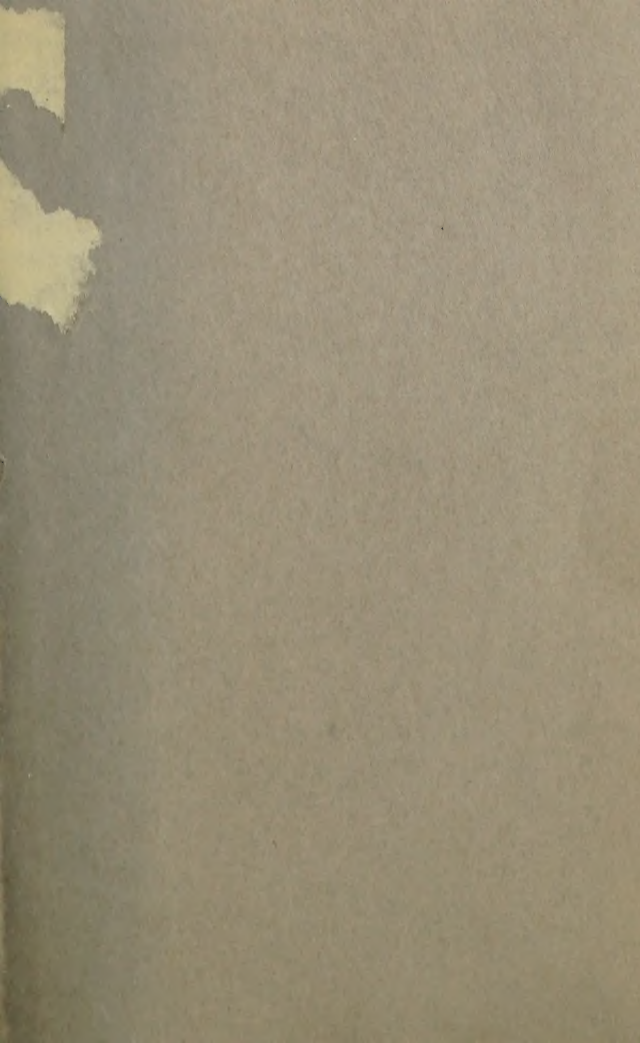
Oil dressings and the use of a few drops of kerosene on a mop brighten up the floor for a time but they hold the dust that settles and gradually a gummy deposit is formed.

COMPOSITION FLOORS

The surfaces of the several sorts of composition floors are so similar to the foregoing floors enumerated that what has been said of finishes and methods of care may be readily adapted as occasion may arise.



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